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(54) SUPPORTING STRUCTURE WITH SUPPORTING PROFILE AND SUPPORT ARMS

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Description

Field of the invention

[0001] The invention, in general, relates to a support structure, in particular to a modular support structure for forming a rack or a shelf or a seat attachable to a wall. The invention also relates to a method of mounting a rack or a shelf or a seat to a wall, making use of such a support structure.

Background of the invention

[0002] FIG. 1 shows a typical prior art bookshelf. It comprises a wooden board 22 which is placed on two or more metal brackets 21 (only one is shown), each of which is separately attached to a wall, for example screwed thereon. The shown metal bracket 21 is composed of three elements: a first elongated profile 23, a second elongated profile 24 which is perpendicular thereto, and a triangular profile 25 which is perpendicular to both profiles 23, 24. Typically, holes are drilled in the two elongated profiles, for attaching the bracket 21 to a wall. The three elements 23, 24, 25 are typically welded together. Two or more of such brackets 21 are attached to a wall, at a distance from each other, it not being easy to place the two brackets at the same height, and a board 22 is then placed on or attached to the brackets. There is a need for a support structure that is easier to manufacture and/or easier to install.

[0003] European patent application EP2510836 describes a supporting structure for supporting shelves on a wall being very simple low cost construction-wise and safe in used. The supporting structure comprises a U-shaped supporting profile and a supporting arms.

[0004] German patent application DE2239818 describes a method for mounting a supporting structure to a wall, the supporting structure comprising a supporting profile and a support arm.

Summary of the invention

[0005] It is an object of the present invention to provide a good support structure that can be used, for example, for forming a seat or a shelf or a rack, or the like (for example, a desktop).

[0006] It is also an object of the present invention to provide a good seat, a good shelf, and a good rack, comprising such a support structure.

[0007] It is further an object of the present invention to provide a good method for mounting such a support structure, seat, shelf or rack to a wall.

[0008] These objects are achieved by a support structure, a seat, a shelf, a rack, and a method according to embodiments of the present invention.

[0009] In a first aspect of the present invention, a support structure is provided for forming a shelf or a rack or a seat, or the like, said support structure comprising:

a U-shaped support profile with a middle wall and two side walls substantially perpendicular to the middle wall, the middle wall having a plurality of first apertures for attaching the support profile to a wall, the two side walls being located at a first distance (H) from one another, and at least one of the side walls, in particular, at least the side wall, having a plurality of pairs of second apertures for attaching support arms;

at least two support arms, each support arm having dimensions such that the support arm is mountable between the two side walls of the support profile in a direction perpendicular to the longitudinal direction (Y) of the support profile, each support arm having a pair of projections that fit into a pair of second apertures in a side wall of the support profile, each support arm having a planar surface on which a planar object can be placed.

[0010] It is an advantage of embodiments of the present invention that the support profile is U-shaped, because on the one hand it ensures great strength and on the other hand it allows the support arm to be placed in between it.

[0011] It is an advantage that one of the two side walls of the support profile (i.e., the top side wall, after placement) has a pair of second apertures, so that the support profile can receive projections of the support arm, which act as a hinge when mounting the support arm, and after mounting act to absorb the moment of forces exerted by and on the support arm.

[0012] Although not necessary, it is a clear advantage that the other side wall (the bottom side wall, after placement) of the support profile also has pairs of second apertures, because it allows small protuberances to snap into said pairs of second apertures.

[0013] A person skilled in the art can choose the dimensions of both the support profile and of the support arm (for example, height, length, width, and particularly the thickness), such that the anticipated load (for example, a wood covering and books) can be borne, and that the support arm fits precisely between the side walls of the support profile.

[0014] It is an advantage that the support arm is placed between the side walls of the support profile, so that the support arm can rest on the bottom side wall.

[0015] It is an advantage of the means of attachment with apertures and with projections, sometimes also referred to as 'lugs' or 'pins', that no screws or other means are necessary (for example, welding) to secure the support arms to the support profile. It is to be noticed that the adjusting screw does not serve to fix the support arm to the support profile, but to bring the support arm to a desired angle. It is an advantage that the fixing can be done in a very simple way, namely by tilting.

[0016] It is an advantage that the support arm is mounted between the two side walls of the support profile, so that it cannot fall out by itself.

[0017] It is an advantage of this mounting structure, in particular of its suspension arrangement, that 'legs' or triangular profiles or other supports are not needed, and preferably none are used, under the support arms, in order to support them. This allows for a sleek and elegant looking solution. Such a bookshelf is also called a 'floating shelf' or 'floating bookshelf', or a board (or rack or seat) with hidden suspension or a board with a blind attachment.

[0018] It is an advantage of this support structure that it allows for modular construction. The end user can select all the components themselves, for example, the amount of support arms, and/or support arms with a specific length, depending on the application, for example, of the load which the support structure has to bear. If the load to be borne is too large, the end user can provide, for example, multiple support arms. If the covering (for example, a bookshelf) is long, the end user may, for example, mount multiple support profiles contiguously against each other. In order to easily mount support profiles contiguously in the longitudinal direction, co-acting connecting means should preferably be provided, such as a tongue and groove connection.

[0019] The projections may be carried out unitarily with the material of the support arm, so that the likelihood of folds or separation or deformation is minimal.

[0020] Optionally, the support arm may have apertures in the planar surface, for securing, for example, a shelf, for example, by screwing, although this is not strictly necessary, a glass plate; for example, can be simply placed on the planar surface, possibly with a felt strip, or the like, between the support arm and the glass.

[0021] The planar object which can be placed on the planar surface could be a shelf or a covering of a seat, or the like. It could also be a desktop. The planar object is preferably slid over the support structure, so that the entire support structure (both support profile and support arms) are no longer visible, and the whole looks very smooth and elegant.

[0022] In embodiments of the present invention, a support structure as described above is provided, each support arm comprising a U-shaped profile.

[0023] It is an advantage of this embodiment if the support arm also mainly consists of a U-section, because such a support arm, on the one hand, has the necessary strength to resist the bending forces, and, on the other hand, can be made relatively easily and inexpensively. In an example, the support arm consists substantially of a U-shaped profile with only a few small parts such as the projections, and/or a screw holder for an adjusting screw, and/or a bent back side, or the like.

[0024] On the other hand, the invention could also work if the support arm were to consist largely of a square or rectangular tube, albeit with a cut-out at the height of the adjusting screw (if present). A U-profile offers the advantage over the tube shape that it requires less material, and that the cut-out for the adjusting screw (if present) may be omitted.

[0025] There is further provided in embodiments of the present invention a support structure, the support profile and the support arms being made of metal.

[0026] In some embodiments, the support profile and the support arm can be made of metal, for example of steel, as it provides the desired strength on the one hand, and on the other hand can be formed easily.

[0027] In an embodiment, a support structure is provided, the support profile and the support arms being made of stainless steel.

[0028] Such embodiments have the advantage that they cannot rust. They are especially useful for applications in damp places, such as in or next to a swimming pool, outdoor applications, or other damp areas such as a bathroom or a laundry room.

[0029] Subsequently, a support structure is provided, as described above, the support profile and the support arms being made by punching and bending of metal.

[0030] It is an advantage of punching that apertures may be provided in a way that is much faster than drilling, and that the apertures may be not only circular, but also, for example, may be elongated.

[0031] In some embodiments, rounded U-profiles can be used in place of U-profiles with a full right angle, since the latter exhibit a relatively sharp edge, and require more material. By bending, sharp corners can therefore be avoided, as well as material saved. In addition, bending is a common, quick and simple production technique.

[0032] In an embodiment of the present invention a support structure is obtained, at least one support arm having at least one aperture in one of the side walls.

[0033] In an embodiment, each support arm has at least one aperture in one of the side walls. Each support arm can have one or more apertures in both side walls.

[0034] 'Side walls' here means the walls that are perpendicular to the planar surface upon which, for example, a shelf is to be placed, i.e., the upright or vertical walls when the support arm is mounted. It is an advantage of such (an) aperture(s) that the support arm can, for example, be attached to a side wall. It is an advantage that in certain applications (e.g. a seat) this (these) aperture(s) may also be used for attaching, for example, a 'leg'. It is further an advantage in certain applications (for example, a rack), that these apertures can be used for attaching partitions, for example, upright boards in the case of multiple shelves above each other, for creating compartments between the individual boards.

[0035] In some embodiments, each support arm of the support structure has an adjusting screw allowing an angle between the support profile and the support arm to be set.

[0036] It is an advantage of certain embodiments of the present invention that an adjusting screw is provided to allow an angle to be adjusted between the support profile and the support arm (albeit to a limited extent, for example in the range of -5° to $+5^\circ$), and this in a continuous manner (i.e. without discrete steps). In this way, all support arms can, for example, be placed exactly level,

so that the covering (for example, wooden board or glass plate) that is placed or slid on it is more uniformly supported, and so that the risk of bursting or deformation is minimal. Also in case of an inclined wall or wall, for example, a wall that is not entirely perpendicular to the ground surface and which, for example, deflects towards the inner side, all support arms can be placed level with the aid of the adjusting screw. By placing sufficient support arms, in most cases, deflection of, for example, long boards is avoided. If some deflection should still occur, the angle between the support profile and the support arm can be adjusted with the aid of an adjusting screw, in an attempt to remedy or minimise the deflection.

[0037] In an embodiment of the present invention, a support structure is provided wherein both of the side walls of the support profile have pairs of second apertures, which are situated opposite each other, each support arm further having a pair of protuberances, which can be inserted into the pair of second apertures in the side wall.

[0038] It is an advantage of these protuberances that the support arm can snap into place in this way, so that the support arm is not only resting, but that a minimal force has to be overcome in order to snap off the support arm again by tilting it upwards. In this way, the support arm can be prevented from tilting upwards by mistake and snapping off. The minimal force which must be overcome can be easily determined by a person skilled in the art, by an appropriate selection of the protuberances (e.g., by an appropriate selection of a pin with a bevelled edge with an appropriate angle and dimensions). Alternatively, instead of protuberances, projections can be provided here too, for example, such as the projections that fit in the top side wall of the support profile. The latter can be of interest for applications where it is desired that the support arms be very hard to detach, or even not at all, except with additional aids in order to push the two side walls of the support profile away from each other.

[0039] With the aid of the support structure described above, a seat, or a shelf, or a rack, or a desktop, can be obtained after applying a planar object over or on the support structure.

[0040] In one aspect, the present invention relates to a seat comprising the support structure described above, further including a covering, applied to the least two support arms.

[0041] The covering of a seat is preferably substantially flat.

[0042] The substantially planar covering may, for example, be a thick wooden plank, for example, 8 cm thick, possibly having a wavy top surface as is typical for seats, in order to better match the shape of a seat surface. Said covering may be simply placed loosely on the support arms, or glued to it, or screwed to it (if the planar surface has the necessary apertures for this purpose). The covering is preferably slid over the support structure (support arms and support profile) so that the support structure is no longer visible.

[0043] Further, a shelf is also described, which comprises the support structure described above, and a shelf or plate applied to the at least two support arms.

[0044] The plate or panel may, for example, be a planar wooden or planar metal or planar glass plate. However, it could also be a bent metal plate, for example, in an L shape or Z shape, with a raised edge in order to prevent deflection, and/or to affix, for example, labels, and/or to create a partition with the back wall (e.g., the wall).

[0045] Still further, a rack is also described, which comprises at least two shelves as described above. In addition, a rack is also described, further comprising at least one upright board or plate, which is placed between the board of the top shelf and the board of the bottom shelf, and which is attached to a side wall (9) of one of the support arms of the topshelf.

[0046] In a further aspect, a kit of parts for assembling a support structure is also provided which comprises at least one support profile described above, and at least two support arms described above.

[0047] A method for mounting a support structure is also provided.

[0048] A method is provided for mounting a support structure described above to a wall, the method comprising the steps of:

a) attaching the U-shaped support profile to a wall, such that the support profile is substantially horizontally oriented, having its middle wall attached to the wall, and such that the two side walls are oriented substantially perpendicular to the wall and that the side wall with the pairs of second apertures is located at the top;

b) orienting a first, respectively second support arm substantially perpendicular to the wall, and positioning the first, respectively second support arm between the two side walls of the support profile, and inserting the two projections of the first, respectively second support arm in a first, respectively second pair of second apertures in the side wall of the support profile which is located at the top, by tilting the first, respectively second support arm, subsequently inserting the projections into the second apertures of the top side wall, and then tilting the first, respectively second support arm so that it is substantially perpendicular to the support profile.

[0049] It is an advantage of this method that it can be very easily performed, and that no specialised personnel and/or equipment (for example, welding equipment) is needed. It is noted that the wall can be either an unfinished wall (for example, if the support profile is incorporated into the plaster), or a finished wall (for example, surface-mounting). If the support profile is built in to the wall (flush mounting), then this also provides additional stability and anchoring in the wall. In addition, flush mounting also has the advantage that the support arms can be removed when, for example, painting or wallpa-

pering or when applying membrane to a wall, in order to facilitate this work. Both in cases of flush mounting and surface mounting, when working with a planar object which is slid over the support structure, the support structure is no longer visible after applying the planar object.

[0050] A method is also provided for mounting a seat to a wall, comprising:

mounting a support structure to a wall as described above,
applying a covering to a first and a second support arm.

[0051] The covering, for example a board, may be simply placed loosely on it, or glued to it, or screwed to it, or attached in some other way.

[0052] In addition, a method for mounting a shelf to a wall is also provided, comprising:

mounting a support structure to a wall as described above,
applying a board to a first and a second support arm.

[0053] The board may be simply placed loosely on it, or glued to it, or screwed to it, or attached in some other way.

[0054] In addition, a method is also provided for mounting a rack with at least two shelves to a wall, comprising:

mounting a first shelf to a wall as described above,
mounting a second shelf to a wall also as described above, substantially parallel to a first shelf.

[0055] Particular and preferred aspects of the invention are set out in the appended independent and dependent claims. Features from the dependent claims may be combined with features of the independent claims and with features of other dependent claims as appropriate and set out in the claims.

[0056] For purposes of summarising the invention and the advantages achieved over the prior art, certain objects and advantages of the invention have been described herein above. Of course, it is to be understood that not necessarily all such objects or advantages may be achieved according to any particular embodiment of the invention. Consequently, persons who are skilled in this matter, will, for example, recognise that the invention may be embodied or carried out in a way that achieves one advantage or a group of advantages as described herein; without necessarily achieving other objects or advantages that are described or suggested herein.

[0057] The above and other aspects of the invention will be apparent from and elucidated with reference to the embodiment(s) described hereinafter.

Brief description of the drawings

[0058] The invention will now be further described, by

way of example, with reference to the accompanying drawings in which:

FIG. 1 shows a prior art bookshelf, comprising at least two brackets and a shelf.

FIG. 2(a) to (c) show three examples of a support structure according to embodiments of the present invention. The support structure of FIG. 2(a) is composed of three support profiles and four support arms, the support structure of FIG. 2(b) is composed of two support profiles and three support arms, and the support structure of FIG. 2(c) is composed of one support profile and two support arms.

FIG. 3 shows an example of a support profile, such as may be used in the support structure of FIG. 2 (for example in position 2a), in perspective view.

FIG. 4 shows the support profile of FIG. 3 in front view.

FIG. 5 to FIG. 8 shows an example of a support arm, such as may be used in the support structure of FIG. 2, in perspective view.

FIG. 6 shows the support arm of FIG. 5 in perspective view from point VI.

FIG. 7 shows the support arm of FIG. 5 in perspective view from point VII.

FIG. 8 shows the support arm of FIG. 5 partially inserted into the support profile of FIG. 3. The optional adjusting screw has also been drawn to clearly indicate its position.

FIG. 9 shows the support arm and the support profile of FIG. 8 in perspective top view.

FIG. 10 shows the support structure of FIG. 9, after the support arm is tilted downwards, in perspective view from point X in FIG. 9.

[0059] The drawings are only schematic and are non-limiting. In the drawings, the size of some of the elements may be exaggerated and not drawn to scale for illustrative purposes. The dimensions and the relative dimensions do not necessarily correspond to actual reductions to practice of the invention.

[0060] Any reference signs in the claims shall not be construed as limiting the scope.

[0061] In the different drawings, the same reference signs refer to the same or analogous elements.

Detailed description of embodiments of the invention

[0062] The present invention will be described with reference to particular embodiments and with reference to particular drawings, but the invention is not limited thereto and is limited only by the claims.

[0063] It is to be noticed that the term 'comprising', used in the claims, should not be interpreted as being restricted to the means listed thereafter; it does not exclude other elements or steps. It is thus to be interpreted as specifying the presence of the stated features, inte-

gers, steps or components as referred to, but does not preclude the presence or addition of one or more other features, integers, steps or components, or groups thereof. Thus, the scope of the expression 'a device comprising means A and B' should not be limited to devices consisting only of components A and B. It means that with respect to the present invention, the only relevant components of the device are A and B.

[0064] Reference throughout this specification to 'one embodiment' or 'an embodiment' means that a particular feature, structure or characteristic described in connection with the embodiment is included in at least one embodiment of the present invention. Thus, appearances of the phrases 'in one embodiment' or 'in an embodiment' in various places throughout this specification may, but do not necessarily, all refer to the same embodiment. Furthermore, the particular features, structures or characteristics may be combined in any suitable manner, as would be apparent to one of ordinary skill in the art from this disclosure, in one or more embodiments according to the claims.

[0065] Similarly, it should be appreciated that in the description of exemplary embodiments of the invention, various features of the invention are sometimes grouped together in a single embodiment, figure, or description thereof for the purpose of streamlining the disclosure and aiding in the understanding of one or more of the various inventive aspects. This method of disclosure, however, is not to be interpreted as reflecting an intention that the claimed invention requires more features than are expressly recited in each claim. The claims following the detailed description are hereby expressly incorporated into this detailed description, with each claim standing on its own as a separate embodiment of this invention.

[0066] In the description provided herein, numerous specific details are set forth. However, it is understood that embodiments of the invention may be practised without these specific details. In other instances, well-known methods, structures and techniques have not been shown in detail in order not to obscure an understanding of this description.

[0067] FIG. 1 shows a prior art bookshelf. It comprises at least two brackets 21 (only one of them is shown), and a wooden board 22.

[0068] FIG. 2(a) shows a support structure 1 according to an embodiment of the present invention. The shown support structure 1 is composed of three support profiles 2a, 2b, 2c that can be attached to a wall (as will be explained below), to which four support arms 10a, 10b, 10c and 10d are attached (as will be explained below). FIG. 2(b) is a variant of FIG. 2(a) and shows another embodiment of a support structure 1 according to the present invention. This support structure 1 consists of two support profiles 2 that can be attached to a wall, to which three support arms 10 are attached. FIG. 2(c) shows a second variant of FIG. 2(a), consisting of a single support profile 2 that can be attached to a wall, and to which two support arms 10 are attached. It is to be noticed that these are

only examples of the invention, and that, for example, a support structure such as that of FIG. 2(a) with only a single support profile 2 and with four support arms 10, is also part of the invention.

5 **[0069]** FIG. 3 shows in more detail an example of a support profile 2, such as may be used in the support structure of FIG. 2(a) to FIG. 2(c), in perspective view. The shown support profile 2 consists of a U-shaped profile with a middle wall 3, here shown upright, as this middle wall is generally attached to an upright wall or the like, for example, making use of the apertures 5. This attaching can be done in known ways, for example by drilling holes in the wall, providing containers or plugs in those holes, and then attaching the support profile with a screw or bolt, but other ways are also possible.

10 **[0070]** The support profile 2 is typically placed level, so that the top side wall 4a and the bottom side wall 4b are horizontal. In the top side wall 4a (and preferably also in the bottom side wall 4b, although this is not strictly necessary) pairs of second apertures 7 are provided, which are located at a predetermined distance 'd' from one another. As will be explained further, these apertures 7 serve to receive projections 12 of support arms 10. In the example of FIG. 3 only a few pairs 7 are shown, but the number may of course be much more.

15 **[0071]** This support profile 2 can, for example, be manufactured by perforating (punching) steel plate of the desired thickness, cutting it, and then bending it. Punching has the advantage (vis-à-vis drilling) that it is a faster technique, and that the apertures 5 need not necessarily have a circular cross-section, as well as it not being necessary to remove burrs.

20 **[0072]** FIG. 4 shows the support profile 2 of FIG. 3 in front view, with the difference that the profile of FIG. 4 also has connecting means 6, such as a protruding element (on the left) that fits into a complementary cavity (on the right), also known as a 'tongue and groove' connection. Such connection elements 6 are especially interesting when multiple support profiles 2 have to be placed abutting each other to form one long support profile, but are not strictly necessary. The support profile shown in FIG. 4 can be used, for example, in position 2b of FIG. 2. Between the two walls a distance 'H' is available (why this is the case will be made clear below).

25 **[0073]** FIG. 5 to FIG. 7 show various views of a preferred embodiment of a support arm 10, as may be used in the support structure 1 of FIG. 2. The support arm 10 comprises a substantially U-shaped profile. It includes a planar surface 13 (in FIG. 5, shown at the top, such as the support arm is mounted in practice), to which a board or covering or the like (not shown) may be applied, for example, by simply placing it on it, or gluing it on it, or screwing it on it, etc. In the latter case, at least one aperture is provided in the surface 13 (not shown).

30 **[0074]** The support arm 10 further comprises two upright side walls 9, which are perpendicular to the surface 13, which provide stiffness and the necessary strength to the support arm. In these side walls 9, apertures 14,

for example, may be provided, to optionally laterally connect the support arm with a partition, for example a wall, if desired. However, these apertures 14 may also be used to provide, for example, upright partition elements (for example, upright separation boards), if the support structure 1 is used as, for example, a bookshelf. The corners 16 may be rounded or bevelled, in order to reduce the risk of injuries.

[0075] The support arm 10 further comprises two projections 12, at a distance 'd' from each other. This is the same distance as the distance between the second apertures 7 of the support profile (see FIG. 3). These projections are sometimes also referred to as 'lugs' or 'pins'. The shape and dimensions of the projections 12 of the support arm 10 is so selected that they can be inserted into the apertures 7 of the support profile 2. Said insertion is further facilitated by the inclined wall 15 of the support arm. The height 'H' of the support arm 10 (see FIG. 7) is selected so that it fits between the two side walls 4a, 4b of the support profile 2 (see FIG. 8 to FIG. 10). During insertion of the support arm 10 between the side walls 4 of the support profile 2, the two projections 12 serve as pivot points, as described in FIG. 8. After insertion of the support arm 10 between the side faces 4 of the support profile 2, the projections 12 serve to bear the moment of flexure of the weight of the support arm 10 itself, and the load which is applied to the support arm 10, for example, in the case of a seat, the weight of the board, and of the person(s) sitting on the seat.

[0076] The support arm 10 can also include two bulges or protuberances 19 at the bottom, located opposite the projections 12. If the bottom side wall 4b of the support profile 2 also has second apertures 7, these protuberances 19 can engage therein (after the tilt). In this way, the support arm can be snapped in place. By giving these protuberances 19 a suitable form, it can be ensured that the support arm 10 can be snapped off again with a relatively small upward force.

[0077] The support arm 10 can optionally also have and adjusting screw 18, and, if necessary, a screw holder 17 with internal screw thread holding this adjusting screw 18, the screw holder 17 opening into an aperture 11, all positioned in such a way that the adjusting screw 18 is provided to press against the middle wall 3 of the support profile 2 when the support arm 10 is inserted between the side walls 4 of the support profile 2. This is shown schematically in FIG. 8 (although the support arm is here not yet tilted). In an embodiment, the support profile 2 and the support arm 10 can have such dimensions that a tilt through an angle range from -5° to $+5^\circ$ with respect to the normal position perpendicular to the middle wall 3, can be adjusted by the adjusting screw 18. The adjusting screw 18 may be an Allen screw.

[0078] FIG. 6 shows the support arm 10 of FIG. 5 as viewed from point VI. Herein, the planar surface 13, the flattened or bevelled edge 15, the projections 12, and the aperture 11 for the adjusting screw 18, are clearly visible.

[0079] FIG. 7 shows the support arm 10 of FIG. 5 as

viewed from point VII (from below). Herein, the screw holder 17, and the adjusting screw 18 are clearly visible. It is noted that the support arm 10 is here drawn upside down, so that the protuberances 19 are now located at the top, and the projections 12 at the bottom, for illustrative purposes.

[0080] FIG. 8 shows how the support arm 10 can be mounted in the support profile 2. In a first movement '(1)', the support arm 10 is positioned as shown, and the projections 12 of the support arm 10 are inserted into the second apertures 7 of the top side wall 4a of the support profile 2. Next, the support arm 10 is tilted in a second movement '(2)', the projections 12 acting as pivot points, so that the support arm 10 is positioned substantially horizontally, and rests on the bottom side wall 4b. Possibly (but not necessarily), the protuberances 19 (if present) engage the second apertures 7 of the bottom side wall 4b. Possibly (but not necessarily), an adjusting screw 18 is present, which can now be adjusted in order to level the planar surface 13.

[0081] FIG. 9 shows the support arm 10 during the snapping-in of the support arm 10 into the support profile 2 (seen from above).

[0082] FIG. 10 shows the support arm 10, after the snapping-in of the support arm 10 into the support profile 2 (seen from below), from point X in FIG. 9.

[0083] With the support structure 1 as described above, it is thus possible to easily and correctly mount seats or boards to different types of walls by means of the support structure (in modular construction), or a kit of parts for assembling a support structure, both surface mounted (after finishing of the walls) and flush mounted (before finishing of the walls). Ideally, with both flush mounting and surface mounting, the support structure is completely hidden after applying a board or seat.

[0084] The maximum load is mainly determined by the material thickness of both the support profile 2 and of the support arms 10, and by the height 'H' (distance between the two side walls 4a, 4b of the support profile 2). The thicker the material thickness, and the greater the height 'H', the larger the carrying capacity. Of course, the anchorage to or in the wall is of crucial importance in case there is a large load.

[0085] Although in the drawings shown only a few apertures (first apertures 5 and/or two apertures 7) are provided in the support profile 2, it will be appreciated that repetitive perforations over the entire length of the support profile is possible.

[0086] The dimensions of the support arms 10 are dependent on the intended dimensions of the seat or of the rack or of the shelves. They can be produced in different sizes. While particular embodiments have been discussed above, changes can thus be made. For example, the rear face can be reduced. The side walls 9 may be placed closer together. Under the adjusting screw 18, an additional plane may also be provided which comes back to the front, at an angle of 90° to the rear vertical plane in which the adjusting screw is positioned. This rear face

ends up under the bevelled edge 15.

[0087] The support structure 1 as described above is suitable for both surface mounting and flush mounting. The support profile 2 can be placed in advance (i.e. before finishing, such as plastering); after finishing of the wall the support arms and the seat itself are mounted in it. The support profile 2 for flush mounting can be applied such that it is suitable for plastering, dry-wall installation, tiling or other forms of wall finishing. From an aesthetic point of view, flush mounting is preferable.

[0088] The support structure 1 as described above offers the following advantages, among others:

(1) Economic and ecological:

[0089] There is a modular construction: no finished goods need to be transported.

[0090] Preferably, the support arm 10 is manufactured from a single piece of metal plate. Because of this, no additional operations are required to join different parts together.

[0091] It can be manufactured out of standard steel plate and components that are easily available everywhere.

[0092] It can be produced through simple production techniques using standard metalworking machinery.

(2) Simple placement:

[0093] The support arms 10 easily snap into the apertures 7 in the support profile 2 provided to this end. Once they are snapped in, the support arms 10 can, if desired, be snapped back out with a simple click.

[0094] Optionally, the support structure is provided with an adjusting screw 18 to make the slope of the support arms 10 horizontal steplessly.

[0095] If the seat is placed in a corner, the support arm 10 may be laterally fixed with a screw (apertures 14 are provided in the side of a support arm 10 for this purpose).

[0096] One basic set and one or more extension kits can be endlessly combined to achieve the desired length.

[0097] There is a logical structure, which allows any person skilled in the art to place this support structure 1, without any need for special equipment (for example, welding equipment).

[0098] It can be used for different thicknesses (the thickness profile can be chosen).

[0099] It can be placed in both surface mounted and flush mounted applications.

[0100] The support profile 2 can be placed first, without the support arms 10. The support arms 10 can be placed afterwards. As a result, there is no disturbance in the building, up to the time of finishing.

[0101] It can be used anywhere on a firm, flat surface (walls, partitions, etc.).

(3) Aesthetic:

[0102] Shelves are mounted invisibly.

[0103] This makes a minimalist and sleek look possible (mounted fully flush).

[0104] The finish of the covering is independent of support arms 10 and support profile 2.

[0105] The structure can easily be provided with extras such as apertures, lighting, or electrical outlets.

[0106] The support structure 1 as described above can be used, for example, for the following applications: shelves; bookshelves; dressers; racks (for example at home or in a shop), horizontal distributions; desktops; shelves in bathrooms, shops, showrooms, libraries; optional in stainless steel version for applications in wet areas such as swimming pools, catering, food, bathrooms, saunas; benches in public places such as banks, libraries, schools, sports halls, and museums.

[0107] The structure is suitable for indoor and outdoor furniture.

Reference numerals

[0108]

- 1 support structure
- 2 support profile
- 3 middle wall
- 4 side wall (of the support profile)
- 5 first apertures (in middle wall of the support profile)
- 6 co-acting connecting means
- 7 second apertures (in side wall of the support profile)
- 9 side wall (of the support arm)
- 10 support arm
- 11 aperture for the adjusting screw
- 12 projections
- 13 planar surface
- 14 lateral aperture
- 15 bevelled edge
- 16 rounded corner
- 17 screw holder
- 18 adjusting screw
- 19 protuberance or bulge

Claims

1. A support structure (1) for forming a shelf or a rack or a seat, or the like, said support structure (1) comprising:

- a U-shaped support profile (2) with a middle wall (3) and two side walls (4) substantially perpendicular to the middle wall, the middle wall (3) having a plurality of first apertures (5) for attaching the support profile (2) to a wall, the two side walls (4) being located at a first distance (H) from one another, and at least one of the side walls

(4), in particular, at least the side wall (4a), having a plurality of pairs of second apertures (7) for attaching support arms (10);

- at least two support arms (10), each support arm (10) having dimensions such that the support arm (10) is mountable between the two side walls (4) of the support profile (2) in a direction perpendicular to the longitudinal direction (Y) of the support profile (2), each support arm (10) having a flat surface (13) on which a planar object can be placed,

characterised in that

each support arm (10) has a pair of projections (12) that fit into a pair of second apertures (7) in a side wall (4a) of the support profile (2).

2. The support structure (1) as claimed in claim 1, each support arm (10) comprising a U-shaped profile.
3. The support structure (1) as claimed in claim 1 or 2, the support profile (2) and the support arms (10) being made of metal and/or the support profile (2) and the support arms (10) being made of stainless steel, and/or the support profile (2) and the support arms (10) being produced by punching and bending of metal.
4. The support structure (1) according to any of the preceding claims, at least one support arm (10) having at least 1 aperture (14) in one of the side walls.
5. The support structure (1) according to any of the preceding claims, each support arm (10) having an adjusting screw (18) to allow adjusting an angle between the support profile (2) and the support arm (10).
6. The support structure (1) according to any of the preceding claims, wherein both of the side walls (4) of the support profile (2) have pairs of second apertures (7), situated opposite each other, each support arm (10) further having a pair of projections (19), which can be inserted into the pair of second apertures (7) in the side wall (4b).
7. A seat comprising the support structure (1) according to any of claims 1 to 6, further including a covering, applied to the at least two support arms (10).
8. A shelf comprising the support structure (1) according to any of claims 1 to 6, and a board or plate placed on the at least two support arms (10).
9. A rack comprising at least two shelves as claimed in claim 8.
10. The rack as claimed in claim 9, further comprising

at least one upright board or plate, which is placed between the board of the top shelf and the board of the bottom shelf, and which is attached to a side wall (9) of one of the support arms (10) of the top shelf.

11. A kit of parts for assembling a support structure (1) according to any of claims 1 to 6, comprising:

- at least one support profile (2) having the features as stated in claim 1;
- at least two support arms (10) having the features as stated in claim 1.

12. Method for mounting a support structure (1) according to any of claims 1 to 6 to a wall, the method comprising the steps of:

a) attaching the U-shaped support profile (2) to a wall, such that the support profile (2) is substantially horizontally oriented, having its middle wall (3) attached to the wall, and such that the two side walls (4) are oriented substantially perpendicular to the wall and that the side wall (4a) with the pairs of second apertures (7) is located at the top;

b) orienting a first, respectively second support arm (10) substantially perpendicular to the wall, and positioning the first, respectively second support arm between the two side walls (4a, 4b) of the support profile (2),

characterised in that the method comprises and inserting the two projections (12) of the first, respectively second support arm (10) in a first, respectively second pair of second apertures (7) in the side wall (4a) of the support profile (2) which is located at the top, by tilting the first, respectively second support arm (10), subsequently inserting the projections (12) into the second apertures (7) of the top side wall (4a), and then tilting the first, respectively second support arm (10) so that it is substantially perpendicular to the support profile (2).

13. Method for mounting a seat to a wall, comprising:

- mounting a support structure (1) to a wall, as claimed in claim 12,
- applying a covering to a first and a second support arm (10).

14. Method for mounting a shelf to a wall, comprising:

- mounting a support structure (1) to a wall, as claimed in claim 12,
- placing a board on our a first and a second support arm (10).

15. Method for mounting a rack with at least two shelves

to a wall, comprising:

- mounting a first shelf to a wall, as claimed in claim 14,
- mounting a second shelf to a wall as claimed in claim 14, said second shelf being substantially parallel to a first shelf.

Patentansprüche

1. Tragstruktur (1) zum Bilden eines Regals oder eines Gestells oder eines Sitzes oder dergleichen, wobei die Tragstruktur (1) Folgendes umfasst:

- ein U-förmiges Tragprofil (2) mit einer mittleren Wand (2) und zwei Seitenwänden (4), die im Wesentlichen senkrecht zu der mittleren Wand liegen, wobei die mittlere Wand (3) eine Vielzahl von ersten Öffnungen (5) zum Befestigen des Tragprofils (2) an einer Wand aufweist, wobei sich die beiden Seitenwände (4) in einem ersten Abstand (H) voneinander befinden, und wobei wenigstens eine der Seitenwände (4), insbesondere wenigstens die Seitenwand (4a), eine Vielzahl von Paaren von zweiten Öffnungen (7) zum Befestigen von Tragarmen (10) aufweist;
- wenigstens zwei Tragarme (10), wobei jeder Tragarm (10) Dimensionen aufweist, sodass der Tragarm (10) zwischen den beiden Seitenwänden (4) des Tragprofils (2) in einer Richtung senkrecht zu der Längsrichtung (Y) des Tragprofils (2) montierbar ist, wobei jeder Tragarm (10) eine flache Fläche (13) aufweist, auf welcher ein ebenes Objekt platziert werden kann,

dadurch gekennzeichnet, dass

jeder Tragarm (10) ein Paar von Vorsprüngen (12) aufweist, das in ein Paar von zweiten Öffnungen (7) in einer Seitenwand (4a) des Tragprofils (2) passt.

2. Tragstruktur (1) nach Anspruch 1, wobei jeder Tragarm (10) ein U-förmiges Profil umfasst.

3. Tragstruktur (1) nach Anspruch 1 oder 2, wobei das Tragprofil (2) und die Tragarme (10) aus Metall hergestellt sind und/oder das Tragprofil (2) und die Tragarme (10) aus Edelstahl hergestellt sind, und/oder das Tragprofil (2) und die Tragarme (10) durch Stanzen und Biegen von Metall hergestellt sind.

4. Tragstruktur (1) nach einem der vorstehenden Ansprüche, wobei wenigstens ein Tragarm (10) wenigstens 1 Öffnung (14) in einer der Seitenwände aufweist.

5. Tragstruktur (1) nach einem der vorstehenden Ansprüche, wobei jeder Tragarm (10) eine Stellschrau-

be (18) aufweist, um das Einstellen eines Winkels zwischen dem Tragprofil (2) und dem Tragarm (10) zu erlauben.

6. Tragstruktur (1) nach einem der vorstehenden Ansprüche, wobei beide der Seitenwände (4) des Tragprofils (2) Paare von zweiten Öffnungen (7) aufweisen, die sich gegenüber voneinander befinden, wobei jeder Tragarm (10) ferner ein Paar von Vorsprüngen (19) aufweist, die in das Paar von zweiten Öffnungen (7) in der Seitenwand (4b) eingesetzt werden kann.

7. Sitz, umfassend die Tragstruktur (1) nach einem der Ansprüche 1 bis 6, ferner beinhaltend eine Abdeckung, die auf den wenigstens zwei Tragarmen (10) aufgebracht wird.

8. Regal, umfassend die Tragstruktur (1) nach einem der Ansprüche 1 bis 6, und ein Brett oder eine Platte, das/die auf die wenigstens zwei Tragarme (10) aufgelegt wird.

9. Gestell, umfassend wenigstens zwei Regale nach Anspruch 8.

10. Gestell nach Anspruch 9, ferner umfassend wenigstens ein aufrechtes Brett oder aufrechte Platte, das/die zwischen dem Brett des oberen Regals und dem Brett des unteren Regals aufgelegt wird, und das/die an einer Seitenwand (9) eines der Tragarme (10) des oberen Regals befestigt ist.

11. Kit aus Teilen zum Zusammenbau einer Tragstruktur (1) nach einem der Ansprüche 1 bis 6, umfassend:

- wenigstens ein Tragprofil (2) mit den in Anspruch 1 aufgeführten Merkmalen;
- wenigstens zwei Tragarme (10) mit den in Anspruch 1 aufgeführten Merkmalen.

12. Verfahren zum Montieren einer Tragstruktur (1) nach einem der Ansprüche 1 bis 6 an einer Wand, wobei das Verfahren die folgenden Schritte umfasst:

- a) Befestigen des U-förmigen Tragprofils (2) an einer Wand, sodass das Tragprofil (2) im Wesentlichen horizontal ausgerichtet ist, wobei seine mittlere Wand (3) an der Wand befestigt und und sodass die beiden Seitenwände (4) im Wesentlichen senkrecht zu der Wand orientiert sind, und sodass sich die Seitenwand (4a) mit den Paaren von zweiten Öffnungen (7) an der Oberseite befindet;
- b) Orientieren eines ersten, jeweils zweiten Tragarms (10) im Wesentlichen senkrecht zu der Wand, und Positionieren des ersten, jeweils zweiten Tragarms zwischen den zwei Seiten-

wänden (4a, 4b) des Tragprofils (2),

dadurch gekennzeichnet, dass das Verfahren Folgendes umfasst

zusätzlich das Einsetzen der zwei Vorsprünge (12) des ersten, jeweils zweiten Tragarms (10) in einem ersten, jeweils zweiten Paar von Öffnungen (7) in der Seitenwand (4a) des Tragprofils (2), das sich an der Oberseite befindet, durch Neigen des ersten, jeweils zweiten Tragarms (10), anschließend das Einsetzen der Vorsprünge (12) in die zweiten Öffnungen (7) an der oberen Seitenwand (4a), und dann Neigen des ersten, jeweils zweiten Tragarms (10), sodass dieser im Wesentlichen senkrecht zu dem Tragprofil (2) liegt.

13. Verfahren zum Montieren eines Sitzes an einer Wand, umfassend:

- das Montieren einer Tragstruktur (1) an einer Wand nach Anspruch 12,
- das Aufbringen einer Abdeckung an einem ersten und einem zweiten Tragarm (10).

14. Verfahren zum Montieren eines Regals an einer Wand, umfassend:

- das Montieren einer Tragstruktur (1) an einer Wand nach Anspruch 12,
- das Platzieren eines Bretts an einem ersten und einem zweiten Tragarm (10).

15. Verfahren zum Montieren eines Gestells mit wenigstens zwei Regalen an einer Wand, umfassend:

- das Montieren eines ersten Regals an einer Wand nach Anspruch 14,
- das Montieren eines zweiten Regals an einer Wand nach Anspruch 14, wobei das zweite Regal im Wesentlichen parallel zu einem ersten Regal liegt.

Revendications

1. Structure de support (1) pour former une étagère ou un râtelier ou un siège, ou analogue, ladite structure de support (1) comprenant :

- un profil de support en forme de U (2) avec une paroi médiane (3) et deux parois latérales (4) sensiblement perpendiculaires à la paroi médiane, la paroi médiane (3) possédant une pluralité de premières ouvertures (5) pour fixer le profil de support (2) à une paroi, les deux parois latérales (4) étant situées à une première distance (H) l'une par rapport à l'autre, et au moins l'une des parois latérales (4), en particulier, au moins

la paroi latérale (4a), possédant une pluralité de paires de secondes ouvertures (7) pour fixer des bras de support (10) ;

- au moins deux bras de support (10), chaque bras de support (10) possédant des dimensions telles que le bras de support (10) puisse être monté entre les deux parois latérales (4) du profil de support (2) dans une direction perpendiculaire à la direction longitudinale (Y) du profil de support (2), chaque bras de support (10) possédant une surface plaque (13) sur laquelle un objet plan peut être placé,

caractérisée en ce que

chaque bras de support (10) possède une paire de saillies (12) qui s'ajustent dans une paire de secondes ouvertures (7) dans une paroi latérale (4a) du profil de support (2).

2. Structure de support (1) selon la revendication 1, chaque bras de support (10) comprenant un profil en forme de U.

3. Structure de support (1) selon la revendication 1 ou 2, le profil de support (2) et les bras de support (10) étant faits de métal et/ou le profil de support (2) et les bras de support (10) étant faits d'acier inoxydable, et/ou le profil de support (2) et les bras de support (10) étant produits par poinçonnage et cintrage de métal.

4. Structure de support (1) selon l'une quelconque des revendications précédentes, au moins un bras de support (10) possédant au moins 1 ouverture (14) dans l'une des parois latérales.

5. Structure de support (1) selon l'une quelconque des revendications précédentes, chaque bras de support (10) possédant une vis d'ajustement (18) pour permettre l'ajustement d'un angle entre le profil de support (2) et le bras de support (10).

6. Structure de support (1) selon l'une quelconque des revendications précédentes, dans laquelle les deux des parois latérales (4) du profil de support (2) possèdent des paires de secondes ouvertures (7), situées de façon opposée les unes aux autres, chaque bras de support (10) possédant en outre une paire de saillies (19), qui peuvent être insérées dans la paire de secondes ouvertures (7) dans la paroi latérale (4b).

7. Siège comprenant la structure de support (1) selon l'une quelconque des revendications 1 à 6, incluant en outre une couverture, appliquée sur les au moins deux bras de support (10).

8. Étagère comprenant la structure de support (1) selon

- l'une quelconque des revendications 1 à 6, et une planche ou plaque placée sur les au moins deux bras de support (10).
9. Râtelier comprenant au moins deux étagères selon la revendication 8. 5
10. Râtelier selon la revendication 9, comprenant en outre au moins une planche ou plaque verticale, qui est placée entre la planche de l'étagère supérieure et la planche de l'étagère inférieure, et qui est fixée à une paroi latérale (9) de l'un des bras de support (10) de l'étagère supérieure. 10
11. Kit de pièces pour assembler une structure de support (1) selon l'une quelconque des revendications 1 à 6, comprenant : 15
- au moins un profil de support (2) possédant les caractéristiques telles qu'indiquées dans la revendication 1 ; 20
 - au moins deux bras de support (10) possédant les caractéristiques telles qu'indiquées dans la revendication 1. 25
12. Procédé pour monter une structure de support (1) selon l'une quelconque des revendications 1 à 6 sur un mur, le procédé comprenant les étapes de :
- a) la fixation du profil de support en forme de U (2) à un mur, de telle sorte que le profil de support (2) soit orienté de façon sensiblement horizontale, ayant sa paroi médiane (3) fixée au mur, et de telle sorte que les deux parois latérales (4) soient orientées de façon sensiblement perpendiculaire au mur et que la paroi latérale (4a), avec les paires de secondes ouvertures (7), soit située en haut ; 30
 - b) l'orientation d'un premier, respectivement d'un second, bras de support (10) de façon sensiblement perpendiculaire au mur, et le positionnement du premier, respectivement du second, bras de support entre les deux parois latérales (4a, 4b) du profil de support (2), 40
- 45
- caractérisé en ce que** le procédé comprend et l'insertion des deux saillies (12) du premier, respectivement du second, bras de support (10) dans une première, respectivement une seconde, paire de secondes ouvertures (7) dans la paroi latérale (4a) du profil de support (2) qui est situé en haut, en inclinant le premier, respectivement le second, bras de support (10), ensuite l'insertion des saillies (12) dans les secondes ouvertures (7) de la paroi latérale supérieure (4a), et puis l'inclinaison du premier, respectivement du second, bras de support (10) pour qu'il soit sensiblement perpendiculaire au profil de support (2). 50
- 55
13. Procédé pour monter un siège sur un mur, comprenant :
- le montage d'une structure de support (1) sur un mur, selon la revendication 12,
 - l'application d'une couverture sur un premier et un second bras de support (10).
14. Procédé pour monter une étagère sur un mur, comprenant :
- le montage d'une structure de support (1) sur un mur, selon la revendication 12,
 - le placement d'une planche sur notre un premier et un second bras de support (10).
15. Procédé pour monter un râtelier avec au moins deux étagères sur un mur, comprenant :
- le montage d'une première étagère sur un mur, selon la revendication 14,
 - le montage d'une seconde étagère sur un mur, selon la revendication 14, ladite seconde étagère étant sensiblement parallèle à une première étagère.

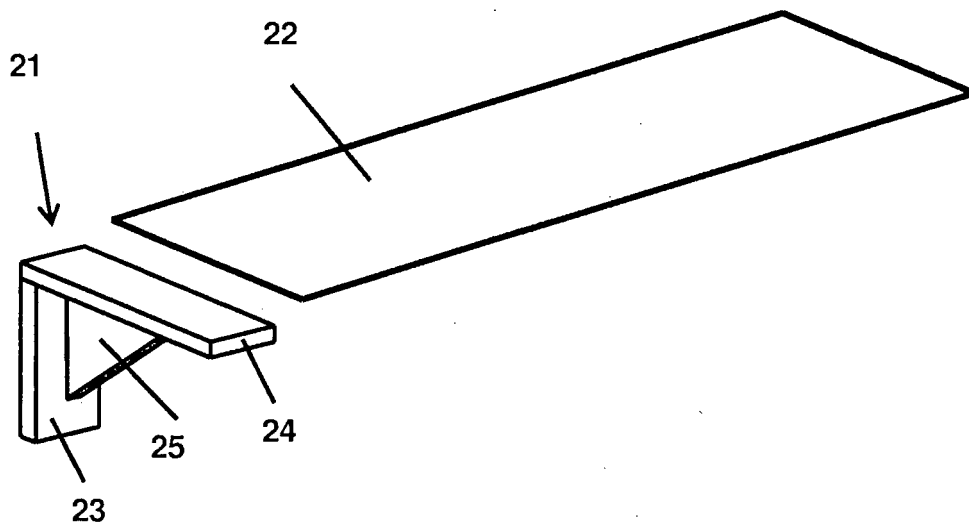
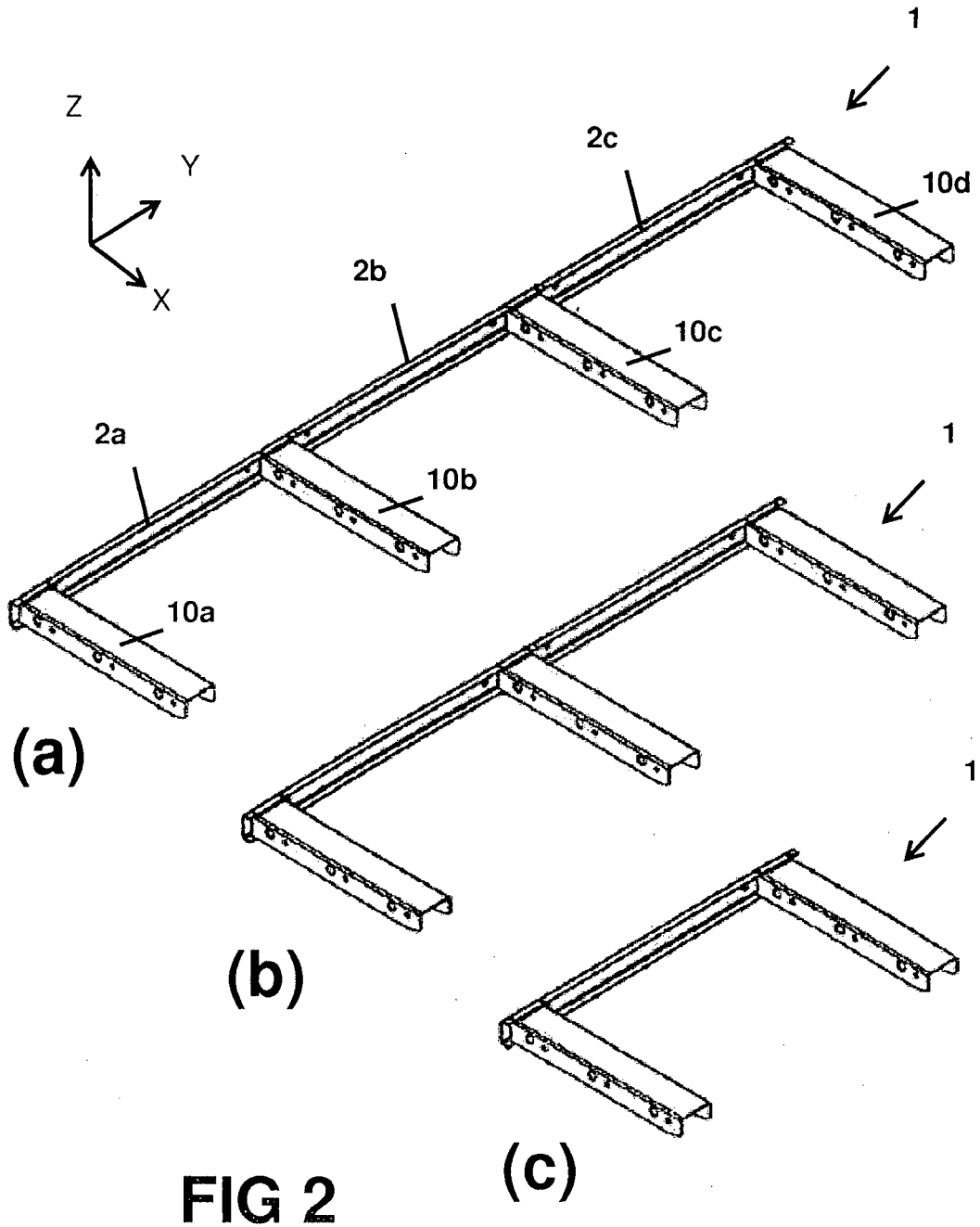


FIG 1



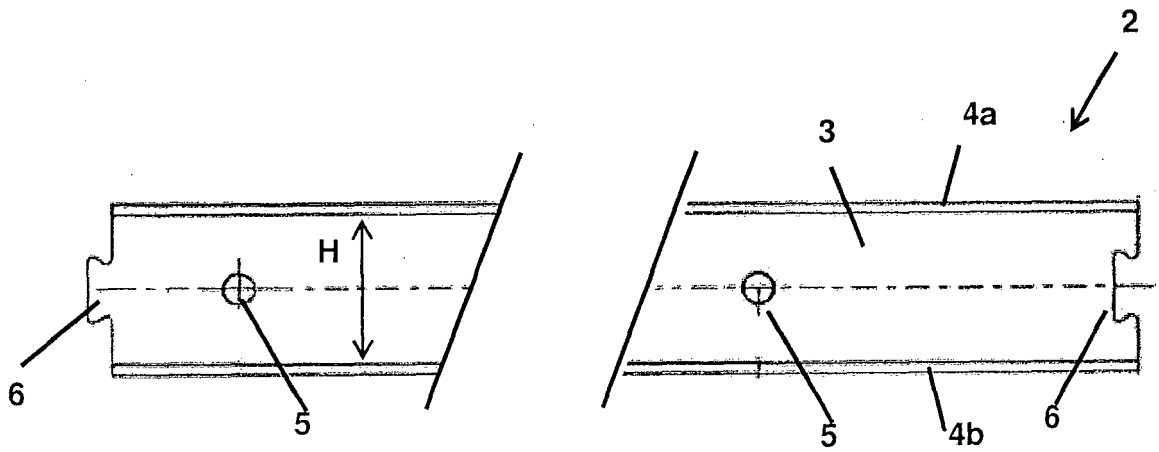
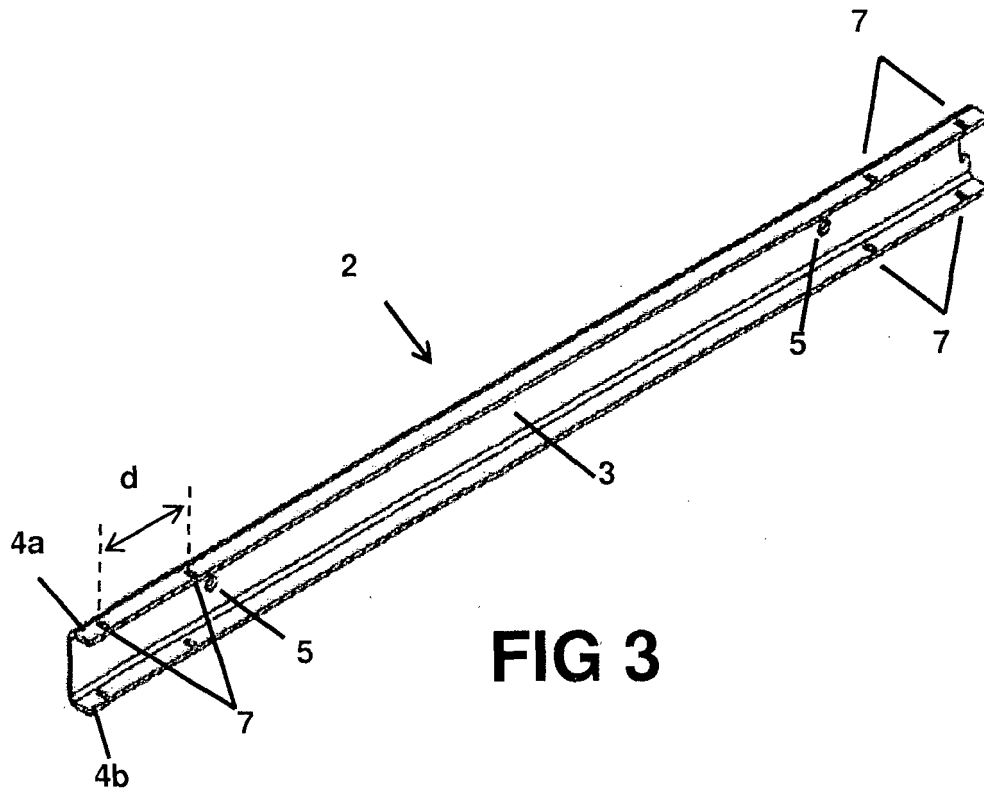


FIG 5

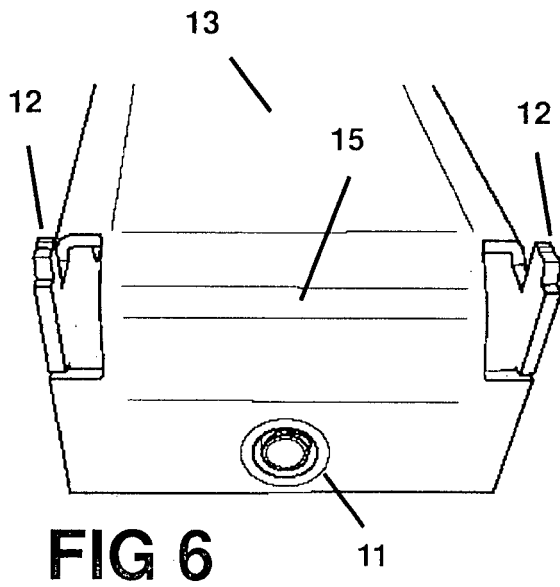
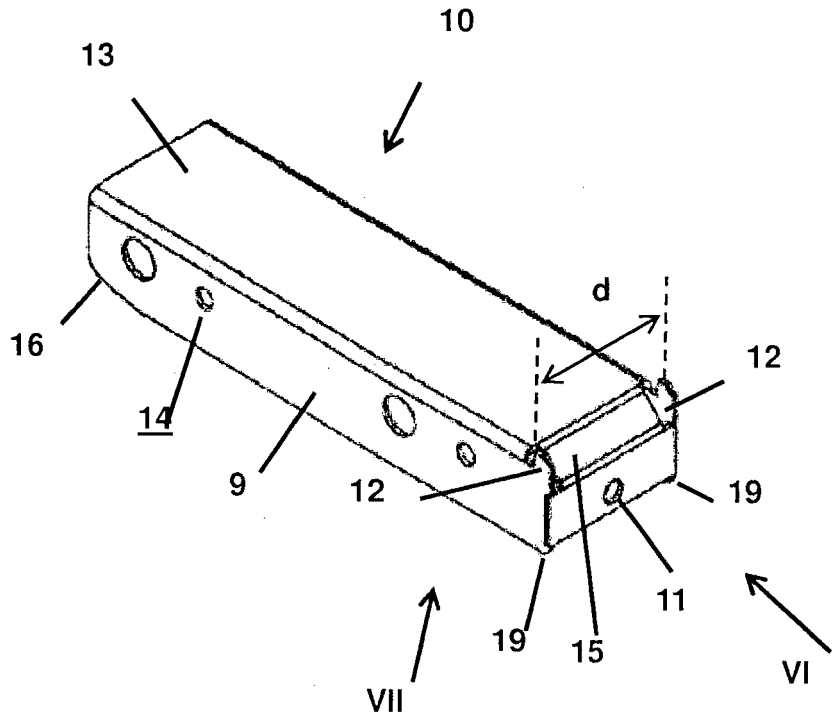


FIG 6

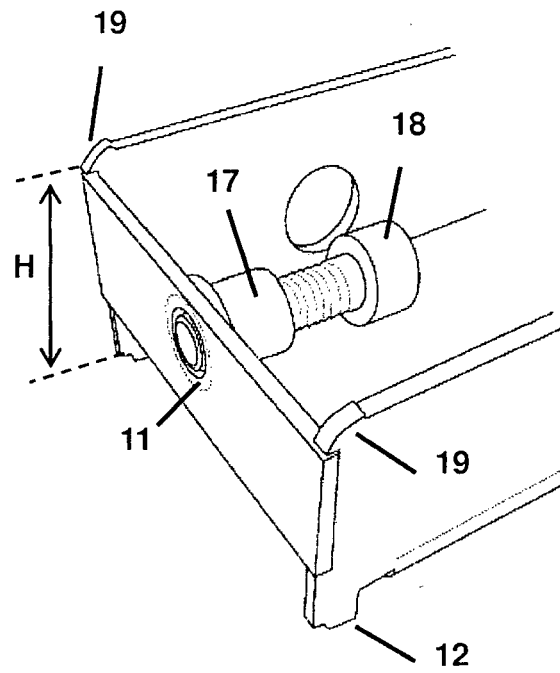


FIG 7

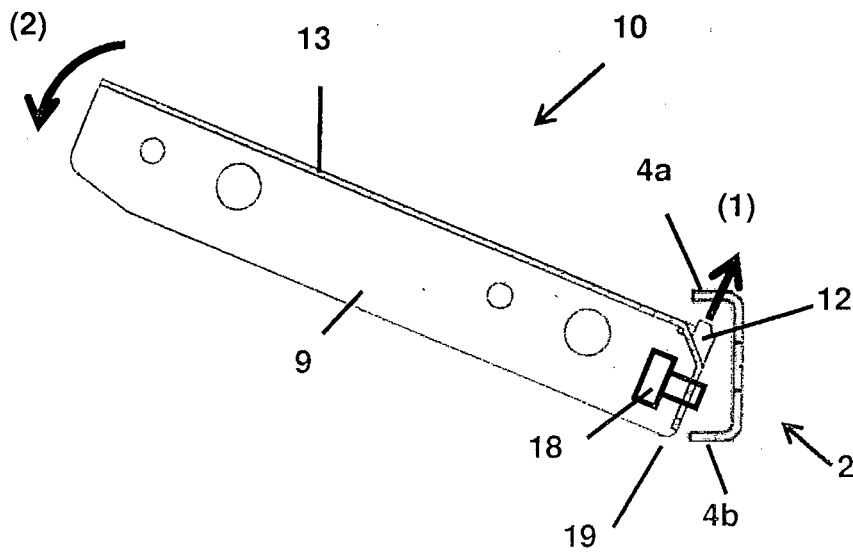


FIG 8

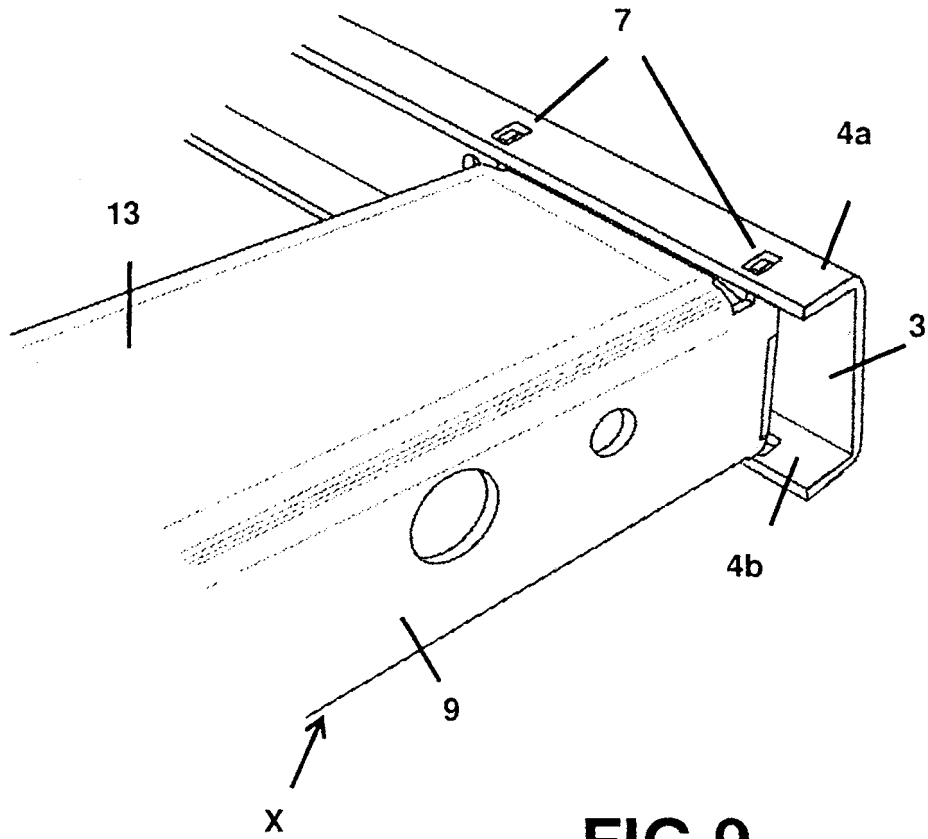


FIG 9

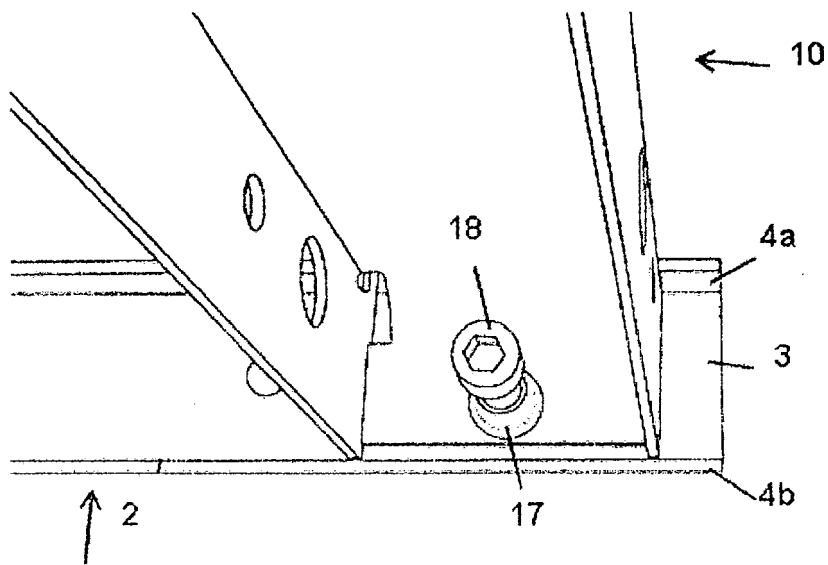


FIG 10

REFERENCES CITED IN THE DESCRIPTION

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